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Grounding, Physicalism, and the Explanatory Gap

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Grounding, Physicalism, and the Explanatory Gap

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Grounding, Physicalism, and the Explanatory Gap

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Contemporary metaphysics is marked by a revived interest in the notion of *ground*. Some philosophers have even suggested that this is the notion needed to best formulate physicalism—the view that the mental is "nothing over and above" the physical. For there are reasons to think that physicalism understood as a grounding thesis (*Grounding Physicalism*) has advantages over the traditional options. In short, the appeal of Grounding Physicalism is that it promises to occupy a middle position between reductive and non-reductive versions of physicalism. Despite its initial appeal, I argue that a new spin on a common objection to physicalism—that it leaves an "explanatory gap"—undermines the enthusiasm for Grounding Physicalism. The explanatory gap problem has been heavily discussed, but usually with the assumption that physicalism is an identity thesis. By contrast, I focus on Grounding Physicalism and argue that it leaves an explanatory gap—*moreover*, one that cannot be addressed in the usual way. I then argue that this creates a dilemma for the Grounding Physicalist.

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1 Introduction

Contemporary metaphysics is marked by a revived interest in the notion of *ground*.[1] A number of philosophers (call them *grounding theorists*) maintain that this notion is indispensable to the philosopher's conceptual toolkit. However, while the recent literature on ground has focused heavily on its logic and connection to other notions in metaphysics, there has been significantly less detailed discussion concerning how the notion should be applied to particular philosophical issues. But that hasn't stopped a number of grounding theorists from suggesting (typically in passing) that ground is exactly the notion needed to successfully develop physicalism—the view that the mental[2] is "nothing over and above" the physical.

Thus, Schaffer (2009) tells us that ground "is the notion the physicalist needs to explicate such plausible claims as 'the fundamental properties and facts are physical and everything else obtains in virtue of them'" (364).[3]

[1]This notion is commonly taken as primitive and illuminated by way of examples. See Audi (2012), Fine (2012), Rosen (2010), and Schaffer (2009) for seminal discussions of the importance of ground to metaphysics; I will follow these theorists in taking the notion of ground to be primitive (but see Wilsch 2015; Wilson 2017). See Koslicki (2015) and Wilson (2014) for skepticism concerning the significance of ground to metaphysics.

[2] Physicalism is supposed to apply to both mental states that are essentially conscious (like the feeling of *pain*) and those that are not (such as states of *belief*). The former are states such that *there is something that it is like* to be in them. Since essentially conscious mental states are the focus of my arguments, I will use the terms "mental," "(phenomenal) experience," and "(phenomenal) consciousness" more or less interchangeably. I will also freely refer to both *states* and *events*, and I will assume that *phenomenal properties* type states (or experiential events) in terms of what it is like to be in (or to undergo) them. None of my arguments hinge on these decisions.

[3]Schaffer is quoting from Loewer (2001). See also Loewer (2009, p. 229).

Similarly, deRosset (2013) claims:

> [O]ne important use of the notion of grounding is to understand physicalism in the philosophy of mind as the idea that physical entities are more fundamental than non-physical entities and, in particular, mental properties, states, or events. . . . [O]n this way of understanding physicalism, it is the view that the entities occupy a 'higher layer' . . . than the physical entities that ground them. (11)

As Rosen (2010) sees it, the debate between physicalists and dualists hinges on whether "the facts about phenomenal consciousness are grounded in, and hence necessitated by, the neurophysiological facts that underlie them" (118).

And according to Dasgupta (2014):

> One might try understanding the picture [of physicalism] as an identity thesis. . . . Or as a thesis of analysis. . . . Or as a supervenience thesis. . . . But the recent interest in ground stems largely from the idea that these formulations do not fully capture the picture, and that we should instead understand it in terms of *ground*. (558)

It is far from clear that the notion of ground is indispensable to stating the *minimal commitments* of physicalism (cf. Melnyk 2016).[4] Nonetheless,

[4]There are reasons to think that it is not. For one, if the physicalist is committed to the claim that the facts about phenomenal consciousness are grounded in the neurophysiological facts that underlie them (as Rosen suggests), then, since grounding is asymmetric, physicalism is inconsistent with the type-identity theory—a paradigmatic physicalist view. The grounding theorist might respond by drawing on Fine (2012)'s distinction between *weak* ground (which moves "horizontally" in the explanatory hierarchy) and *strict* ground (which moves "vertically" in the explanatory hierarchy) and then maintaining that the physicalist is minimally committed to the claim that the mental is either weakly or strictly grounded in the physical. However, the notion of ground might be significant to physicalism even if it is possible to state the minimal commitments of the view without it. For this reason, I

this enthusiasm for the significance of ground to physicalism is not without warrant. For there are important reasons to think that the notion of ground can be used to develop a version of physicalism (call it *Grounding Physicalism*) that has significant advantages over the traditional options. The appeal of Grounding Physicalism is that it promises to occupy a middle position between reductive and non-reductive versions of physicalism. On the face of it, Grounding Physicalism is less demanding than reductive versions of physicalism, because it does not require that mental phenomena be identified with (or defined in terms of) physical phenomena. On the other hand, unlike some versions of non-reductive physicalism, it can adequately capture the idea that the mental *depends* on and is *explained* by the physical.

My aim here is largely negative. I will argue that a new spin on a common objection to physicalism—that it leaves an "explanatory gap" (Levine 1983, 1993)—undermines the grounding theorist's enthusiasm for Grounding Physicalism. The explanatory gap problem has been heavily discussed in the philosophy of mind. However, a number of these discussions proceed by simply assuming that physicalism is fundamentally an identity thesis.[5] By contrast,

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treat Grounding Physicalism as a *version* of physicalism. My arguments equally apply to the stronger approach, which takes physicalism to just *be* "the claim that the physical facts ground the mental facts" (Bennett 2011, 33). Thanks to Brad Saad and Jon Litland for discussion.

[5]Though there is some disagreement as to whether phenomenal properties are identical to neural properties or higher-order properties of some sort. This comes out clearly in Tye (1999): "[T]he physicalist can respond that the explanatory gap question has a straightforward answer: this feeling is one and the same as a certain higher-level physical state Q and P realizes Q. . . . No doubt it will be said that this reply by the physicalist merely shifts the focus of the puzzle from P to whatever higher-level physical state Q is chosen" (717).

I will take Grounding Physicalism as my target and argue that it leaves an explanatory gap—*moreover*, one that cannot be addressed in the usual way. I will then argue that this creates a dilemma for the Grounding Physicalist.

As a preview, suppose that some particular experience of pain is grounded in a neural event. Two questions arise. The first is what explains the fact *that* that experience of pain is grounded in a neural event. The second is what explains the grounding *patterns* involving experiences of pain—for instance, the fact that, *necessarily*, if such a neural event occurs, it grounds the experience of pain. I will argue that both questions are to be answered by appealing to "essentialist truths" about the grounded.[6] The problem that the Grounding Physicalist confronts is that there just doesn't seem to be anything about the nature of pain that requires it to be grounded in a neural event or indeed any physical event whatsoever. The essence of pain, as Fine (2012) might put it, knows nothing of the physical.

Since the grounding facts and patterns involving pain cry out for expla-

See also Block and Stalnaker (1999, pp. 24–5).

[6]The idea that there is an explanatory connection between ground and essence is a theme in Dasgupta (2014), Fine (2012), Rosen (2010), and Trogdon (2013). Trogdon (p. 471) also suggests that the explanatory gap problem for physicalism can be understood in terms of the explanatory connection between ground and essence; however, his aim is to explain why ground is necessitating, which I take for granted. Moreover, while my arguments are similar to Dasgupta's, our discussions diverge in two crucial respects. First, I argue that the explanatory connection between ground and essence *undermines* Grounding Physicalism. Second, my contention that Grounding Physicalism leaves an explanatory gap does not depend on the controversial claim that the facts about what grounds what are partially *grounded* in essentialist truths. Indeed, in §3, I argue against Dasgupta's view, though I ultimately arrive at a nearby one. I was pleased to discover that Greenberg (2001) arrives at a similar conclusion with respect to a grounding-based theory of mental content.

nation, Grounding Physicalism leaves a genuinely explanatory gap. To bridge the gap, we need a better understanding of the nature of pain. One way to do this is to provide a (partial or full) "real definition" of pain—to state (at least in part) *what it is* for an individual to be in pain. Yet, if our definition is a success, we end up with a version of physicalism that has no clear advantage over the traditional reductive versions. This presents the Grounding Physicalist with a dilemma: either leave a distinctive explanatory gap or else abandon the considerations that motivated Grounding Physicalism in the first place.

The paper proceeds as follows. In §2, I motivate Grounding Physicalism by discussing the shortcomings of reductive and non-reductive versions of physicalism and then arguing that Grounding Physicalism avoids these shortcomings. In §3, I argue that the grounding facts and patterns involving consciousness are to be explained by essentialist truths about consciousness, even if those essentialist truths do not ground any grounding facts or patterns. In §4, I provide reasons for thinking that Grounding Physicalism leaves an explanatory gap. Finally, in §5, I argue that a popular response to the explanatory gap problem is unavailable to the Grounding Physicalist, and I establish my dilemma. The upshot of the dialectic is a dose of pessimism for the usefulness of the notion of ground to the mind–body problem.

2 The Shift to Grounding Physicalism

The history of physicalism in the philosophy of mind reveals a progression from reductionism to non-reductionism. This is not to say that non-reductionism is now widely accepted; on the contrary, non-reductionism is highly problematic. The interest of Grounding Physicalism is that it promises to avoid the problems of both. To see why, I will briefly outline the move from reductionism to non-reductionism. This will put me in a position to explicate Grounding Physicalism as a middle position between these two extremes.

2.1 Reductive physicalism

The most well-known version of reductive physicalism is the mind–brain type-identity theory, which can be traced back to Armstrong (1968), Place (1956), and Smart (1959). According to this view, phenomenal properties are identical to neural properties (the toy example is pain = c-fiber firing). Type-identity theorists sometimes motivate their view by proposing "topic-neutral" or causal/functional analyses of phenomenal concepts and then arguing that neural properties satisfy those analyses. A posteriori type-identity theorists, by contrast, motivate their view as an inference to the best explanation (Block and Stalnaker 1999; McLaughlin 2003).

There are a number of well-known problems with the type-identity theory, but I will mention one of the most widely discussed. The main idea is that mental states are *multiply realizable*: they are "realized" in sufficiently complex systems of varying physical makeup and in the same system as a result

of different physical processes. But if that is right, then the type-identity theory is empirically implausible. Melnyk (2008) summarizes the objection succinctly:

> [B]oth the plasticity of the human brain (e.g., in recruiting new regions of the brain to subserve functions previously subserved by an injured region) and the existence of pain-feeling creatures with nonhuman neurophysiologies (e.g., octopuses) make it unlikely that any single type of human neurophysiological state is required for pain. (1283–4)

The type-identity theory also rules out the existence of non-carbon based conscious systems. Taken together, these two points suggest that the type-identity theory is hopelessly chauvinistic (Block 1978). Call this the *multiple realizability problem*.

Functionalism is sometimes presented as the best alternative to the type-identity theory.[7] There are a number of theories that go by the label "functionalism," and the details vary, but they all share a commitment to the existence of a tight metaphysical connection between mental states and those states that play an appropriate causal role in mediating between stimulus inputs and behaviorial outputs. Since distinct physical states can play the same causal role, functionalism appears to have the resources to avoid the multiple realizability problem.

However, appearances can be misleading. If pain in human beings is *identical* to the state that plays a certain causal role, then empirical investigation should put us in a position to identify pain with a particular state

[7]See, for example, Putnam (1975).

(presumably a neural one). This raises the problem of multiple realizability all over again. It might be responded that "pain" is a context-sensitive definite description that refers to distinct properties in different species (Lewis 1980). Yet, even if "pain" in English is a definite description, we can simply introduce a term, "pain*," to rigidly designate the *feel* of pain. The question is whether *that feel* (*pain**) is identical to a neural property—and if it is, then functionalism has no clear advantage over the traditional type-identity theory.[8]

This puts pressure on the functionalist to identify the property of *pain* (or at least the property of *having pain*) with a higher-order functional property, which can be *realized* by distinct physical states. However, if the type-identity theory is hopelessly chauvinistic, then this version of functionalism is hopelessly liberal. As Block (1978) has argued, it is possible for the entire population of China to realize a complete functional description of the human mind, even though there is prima facie doubt that the system consisting of that population is phenomenally conscious.[9] In general, absent and inverted

[8]Kim (1992) suggests that *pain**, if it exists at all, is identical to a disjunction of species-specific properties. Similarly, Shoemaker (2007) appears to hold that each phenomenal property is identical to the disjunction of its realizers. Disjunctivist theories have three major problems. The first problem is epistemic: as Block (2002) puts it, "whether [such a view] is true or not, we could have no good reason to believe it" (408); for unless we endorse analytic functionalism, we have no way of determining *which* disjunctive property is identical to *pain**. See Hohwy (2004) for a response to Block. The second problem is causal: though it is plausible that mental properties are causally efficacious in the production of behavior, it is unclear whether "wildly disjunctive" properties are causally efficacious in general, which suggests that mental properties are not disjunctive properties (cf. Horgan 1993, 576–7). The third problem is ontological: it is unclear whether disjunctivism amounts to eliminativism; Audi (2013), for example, argues that disjunctive properties do not exist.

[9]The China-body problem is decisive against standard analytic functionalism, because

qualia cases suggest that functionalism simply leaves out the most important part of consciousness: the "what-it's-likeness" of experience (cf. Levine 1983, 356). It is worth pointing out that reductive representationalist theories of consciousness arguably face the same problem (Levine 1997, 109–11), not to mention empirical concerns (Pautz 2010).

2.2 Non-reductive physicalism

The inadequacies of type-identity and functionalist theories of consciousness motivated a number of philosophers to abandon the reductionist project. The task was then to render phenomenal properties physicalistically acceptable without identifying them with (or defining them in terms of) physical or functional properties. One extensively discussed approach to this task appeals to supervenience. The supervenience-based non-reductive physicalist (SBNP for short) makes two central claims. The first is a supervenience claim—for example, that any world that is a minimal physical duplicate of the actual world is a mental duplicate of the actual world (Jackson 1994). The second is that phenomenal properties are neither identical nor reducible to physical/functional properties.

There are two major problems with SBNP. First, supervenience is far too weak of a notion to guarantee that the mental is "nothing over and above"

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it shows that psycho–functional identity statements are neither analytic nor a priori. Moreover, insofar as conceivability is defeasible evidence for metaphysical possibility, the thought experiment counts against a posteriori psychofunctionalism. For a response to the China-body problem, see Tye (forthcoming).

the physical. According to Crane (2010), for example, both emergentists and physicalists can *agree* that "mental and other higher-level phenomena supervene on the physical" (29).[10] They simply disagree as to *whether* (or *how*) mental phenomena *depend* on and are *explained* by physical phenomena. Supervenience does not adjudicate this dispute. Therefore, supervenience is not sufficient for nothing-over-and-aboveness. Call this the *explanatory/dependence problem*.

Second, the supervenience of the mental on the physical cries out for explanation. If a version of physicalism lacks the resources to provide such an explanation, then that counts significantly against the view. As Kim (1989) puts it, "If the global supervenience of the mental on the physical were to be proposed as an unexplainable fact that we must accept on faith, I doubt that we need to take the proposal seriously" (42). For related reasons, Horgan (1993) argues that physicalism requires *superduper*venience: "ontological supervenience that is robustly explainable in a materialistically acceptable way" (577). This is not a problem for the reductive physicalist. After all, if pain

[10]It is, of course, debatable whether the British emergentists of the late-nineteenth and early-twentieth centuries would have agreed that the mental supervenes on the physical with *metaphysical* (as opposed to merely *nomic*) necessity; Horgan (1993) and Wilson (1999), for example, are inclined to think that they would have, but see McLaughlin (1992) for an opposing interpretation. The crucial point is that the British emergentists could have *coherently claimed this* while still holding a position that should not sit well with physicalism (cf. Horgan 1993, 559–60). For an apparently dissenting opinion, see Howell (2009); however, since Howell construes supervenience in a metaphysically loaded way, we may not actually disagree. The following analogy should further drive the point: non-naturalist moral realists are paradigmatic anti-physicalists, but almost all of them maintain that the moral supervenes on the natural with metaphysical necessity.

just *is* the second-order property of having some property or other that plays a certain causal role, and, as a matter of fact, only physical properties play that role, then there is no mystery as to why pain is correlated with the physical across modal space. However, since SBNP entails that phenomenal properties are irreducible, it is committed to the existence of *brute* modal correlations of simple phenomenal properties with complex physical properties. These correlations are "modal danglers" that count against the view for the same reason that brute psychophysical laws count against property dualism (Smart 1959). Call this the *dangler worry*.

It is for these and other reasons that a number of philosophers rejected non-reductionism for reductionism. The problem, according to Horgan (1993), is that reductive versions of physicalism "usually end up susceptible to counterexamples of one sort or another" (579). What we need, Horgan suggests, is a way of "construing higher-order properties which (i) do not provide reductive sufficient conditions, but nevertheless (ii) render the physical supervenience of these properties materialistically explainable anyway," thus making room "for the higher-order properties as part of the physical world" (580). Perhaps the notion of ground is exactly what we need.[11]

[11]The careful reader might rightly wonder if there is a straightforward argument from the shortcomings of reductive and supervenience-based versions of physicalism to the significance of ground to the mind–body problem. Many grounding theorists appear to assume that there is. For example, as quoted earlier, Dasgupta (2014) claims, "One might try understanding [physicalism] as an identity thesis . . . [or] as a supervenience thesis. . . . *But the recent interest in ground stems largely from the idea that these formulations do not fully capture the picture, and that we should instead understand it in terms of ground*" (558; emphasis added). This, however, is an oversimplification. Plausible alternatives also include the constitution

2.3 From superdupervenience to Grounding Physicalism

To make Grounding Physicalism explicit, I need to introduce some important provisos. First, I will assume that grounding is a relation between facts, and I will follow Rosen (2010) in understanding *facts* to be "structured entities built up from worldly items—objects, relations, connectives, quantifiers, etc.—in roughly the sense in which sentences are built up from words" (114).[12] Throughout, I will use uppercase letters ("P," "Q") for facts/propositions; lowercase letters ("p," "q") as variables ranging over facts/propositions; uppercase Greek letters ("Δ," "Γ") for collections of propositions; and "$\wedge\Delta$" for the conjunction of each fact $p \in \Delta$. I will employ the convention of using "$[P]$" as a name for the fact that P, and I will use the symbol "$\leftarrow$" to designate the grounding relation so that "$[P] \leftarrow [Q]$" means "$[P]$ is grounded in $[Q]$."

Second, I will take ground to be an *explanatory* notion. Thus, for any p and q, if $[p]$ grounds $[q]$, then $[p]$ *metaphysically explains* $[q]$.[13] For example,

formulation (Pereboom 2011), the determinable–determinate formulation (Yablo 1992), and the powers-based subset formulation (Wilson 1999). That said, the fact that there is no consensus on these versions of physicalism is a reason in and of itself to explore Grounding Physicalism as a new alternative. So, for my dialectical purposes, I will simply set these other views aside. Thanks to Jessica Wilson for pressing me to address this point.

[12]Two alternatives are to construe grounding as a relation between entities of various ontological categories (Schaffer 2009) or to express grounding claims via a sentential operator (Dasgupta 2014; Fine 2012; Litland forthcoming). My assumption is for convenience, and it is possible to restate my arguments in terms of these other approaches. For the sake of brevity, I will occasionally speak as if properties, states, and events are relata of the grounding relation; on such occasions, the reader should understand my claims in terms of facts involving those entities.

[13]This is not uncontroversial. Schaffer (2012), Audi (2012), and Wilson (2016) distinguish metaphysical relations from the "explanations" they "back." If Jenkins (2008) is correct, then the grounding relation and the explanations that it backs might be distinct realizations

suppose someone asks why there is a party in the conference room. One legitimate way to answer this question is to cite some *cause* of the departmental event (say, the chair's planning it). But another legitimate way to answer the question is to point a complex social fact that synchronically explains the fact that there is a party in the conference room. According to many grounding theorists, to answer the question in this latter way just is to point to some fact that putatively grounds the fact that there is a party in the conference room.

Third, I will take the grounding relation to be transitive, asymmetric, and irreflexive.[14] I will also assume that grounding is necessitating, which is to say that for any collection of facts p_1, p_2, ... $\in \Delta$ and any fact q, if p_1, p_2, ... ground q, then it is *metaphysically necessary* that if $\wedge\Delta$ is the case, then q is the case. These assumptions are shared by nearly all grounding theorists who are sympathetic to Grounding Physicalism.[15]

Finally, I should say something about the term term "physical." This raises a number of difficult questions that I cannot hope to engage here.[16] But

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of the same *explanation role*. It is enough for my purposes that there is *some* tight connection between grounding and explanation.

[14]Strictly speaking, since full grounding is a variable arity relation on the side of the grounds, more precise principles are needed (see Rosen 2010, 115–6). But since I will focus almost exclusively on binary statements of ground, this complication won't matter for my purposes.

[15]Schaffer (2012) rejects transitivity and Leuenberger (2014) rejects necessitation. See Litland (2013) for a defense of transitivity and Trogdon (2013) for a defense of necessitation. These disputes may not matter for my purposes, because it can just be stipulated that transitivity and necessitation hold with respect to the cases that bear on the truth of physicalism.

[16]Among them: Does physics only characterize the world in terms of structure and dynamics? Does a property count as physical if it is the referent of a predicate of current physics, or must we appeal to the predicates of some future or ideal physics? Do the entities

to add some positive content to the term, I will make some purely *stipulative* remarks. In the first place, I will take an entity to be *micro*physical only if it is fundamental and definable in wholly non-phenomenal terms. By contrast, I will take an entity to be *macro*physical just in case it is fully grounded in the microphysical. Officially, then, I will take an entity to be *physical* just in case it is either microphysical or macrophysical. However, unless otherwise indicated, I will use "physical" as a shorthand for "microphysical." I believe that this is what grounding theorists have in mind when they discuss physicalism, but it should be possible to run my arguments with different conceptions of the physical.[17]

At first pass, Grounding Physicalism in the philosophy of mind is the following thesis:

> *Grounding Physicalism:* The facts about consciousness are fully mediately grounded in the physical facts.[18]

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posited in the special sciences count as physical? See Stoljar (2001, 2010) and Wilson (2006) for critical discussion.

[17] In order to stay neutral on the question of whether reality is foundationless, the Grounding Physicalist might take an entity to be microphysical only if it is definable in wholly non-phenomenal terms and such that not all of the facts about it are grounded in facts about other entities (Raven 2015). The condition that a microphysical entity be definable in wholly non-phenomenal terms is meant to rule out a grounding-based version of panpsychism, which is a topic for another paper. In my view, a grounding-based version of panpsychism is no better than Grounding Physicalism, since the grounding phenomena involving consciousness as we know it are to be explained by the essences of the phenomenal properties that type states in terms of what it is like for *subjects like us* to be in them, *not* the essences of phenomenal properties that type states in terms of what it is like for the *fundamental entities* to be in them. This is a way of putting the *grain problem* for panpsychism (Lockwood 1993).

[18] More broadly: the *mental facts* are fully mediately grounded in the physical facts. See

By "fully mediately," I mean that there is some chain of ground leading up from the physical facts to the facts about consciousness such that there is no stricter or fuller account of why the facts about consciousness obtain. In other words, the physical facts might fully ground the facts about consciousness *by* grounding various intermediate facts (such as chemical, biological, or neurological facts).[19]

Moreover, Grounding Physicalism is a thesis about the *metaphysical* ground of consciousness (cf. Schaffer forthcoming, 15). The caveat is needed, because Fine (2012) has suggested that ground comes in three distinct "strengths": metaphysical, natural, and normative. These differ modally. For example, if $[P]$ naturally grounds $[Q]$, then, claims Fine, $[P \supset Q]$ is *naturally* necessary but *metaphysically* contingent. Fine holds that the varieties of necessity—metaphysical, natural, and normative—are sui generis (Fine 2002). I cannot afford to discuss these ideas here. Instead, I merely flag them in order to point out that it would be unacceptable to formulate Grounding Physicalism as a thesis about *natural* ground, because *even dualists* can accept that the facts about consciousness are naturally grounded in the physical facts.

Consequently, Grounding Physicalism entails that for any fact about consciousness p, there is some non-empty collection of physical facts Δ such

fn. 2 above.

[19]The intuitive idea is that the *immediate* grounds for a grounded fact $[P]$ are to be located on the next lower level while the *mediate* grounds for $[P]$ are to be located by chaining relationships of immediate ground together. See Fine (2012) for a precise characterization of the distinction between mediate/immediate and partial/full ground.

that:

Necessitation: $\Box(\wedge\Delta \supset p)$.

However, Grounding Physicalism does not entail necessitation in the other direction (cf. deRosset 2013, 6). It is consistent with Grounding Physicalism that the same phenomenal properties are grounded in different physical properties. For suppose $[Fa]$ grounds $[Ga]$. It follows that $\Box(Fa \supset Ga)$ obtains, but not that $\Box(Ga \supset Fa)$ obtains. So, Ga might obtain without Fa—say, if some other fact had grounded it. It is for this reason that Grounding Physicalism avoids the multiple realizability problem that confronts the type-identity theory.

Moreover, Grounding Physicalism entails the global supervenience of the mental on the physical (cf. Schaffer forthcoming, 19–20). For if Grounding Physicalism is true, then the physical facts necessitate the mental facts. And if the physical facts necessitate the mental facts, then any possible world that is a minimal physical duplicate of the actual world will be a mental duplicate of the actual world. So, if Grounding Physicalism is true, the supervenience of the mental on the physical is explained by the the nature of ground. Hence, on the face of it, Grounding Physicalism avoids the dangler worry.[20]

[20] As Bader (forthcoming) puts it, "One is to avoid a situation whereby the supervenience of one family of properties on another is a sheer coincidence. . . . This can be achieved by positing a grounding relation . . . [that] implies the supervenience of the former on the latter, thereby allowing us to discharge the explanatory burden that is incurred when positing the supervenience [relation]" (9). That said, in §3.2 below, we will see that Grounding Physicalism avoids one dangler worry only to potentially face another.

Grounding Physicalism also appears to rule out emergentism. For one, since ground is an explanatory notion, the mental facts are ultimately explained by the physical facts. Second, according to a popular account of fundamentality (see §3.1 below), if consciousness is metaphysically grounded, then consciousness is non-fundamental (cf. Dasgupta 2014, 563). If emergentism is the view that consciousness is a fundamental, physically unexplainable phenemenon in the sense that it is not metaphysically grounded in the physical, then Grounding Physicalism avoids the explanatory/dependence problem.[21]

Last but not least, Grounding Physicalism is immune to the charge that it leaves out the most important part of consciousness. That is because Grounding Physicalism does not *entail* that phenomenal properties are reducible to physical properties. It is consistent with Grounding Physicalism, for example, that the essence of pain is exhausted by its "what-it's-likeness."[22] That is why I earlier suggested that Grounding Physicalism promises to occupy a middle position between traditional versions of reductive and non-reductive physicalism.

This completes my sketch of Grounding Physicalism. I now turn to the

[21]Melnyk (2016) denies that grounding is sufficient for nothing-over-and-aboveness. If he is correct, then the Grounding Physicalist might face a similar problem to the explanatory/dependence problem. Even so, Grounding Physicalism still has *some* advantage over supervenience-based non-reductive physicalism. Whether or not it ultimately secures nothing-over-and-aboveness may be a verbal issue that I cannot afford to discuss further here.

[22]As we will see in §§3–4, this is part of the problem. There is pressure on the Grounding Physicalist in two conflicting directions: on the one hand, to hold a thoroughly non-reductive view, but on the other, to close the explanatory gap.

main aim of the paper: to establish my dilemma for Grounding Physicalism. I will do this in roughly two stages. In the first stage, I will argue that the grounding facts and patterns involving consciousness are to be explained by the nature of consciousness itself. In the second stage, I will argue that this puts Grounding Physicalism in serious trouble. The trouble is this: if the nature of consciousness does not explain the grounding facts and patterns involving consciousness, then Grounding Physicalism leaves a distinctive explanatory gap.

3 Grounding and Essence

3.1 The grounding facts

As I understand it, Grounding Physicalism is the thesis that the facts about consciousness are grounded in the physical facts. This commits the Grounding Physicalist to the existence of *grounding facts*: facts about what grounds what. To see why this is problematic, it is important to note that a number of grounding theorists presuppose the following claims about fundamentality:

> *Fact Fundamentality:* For all facts p, p is fundamental iff p is ungrounded.
>
> *Entity Fundamentality:* For any entity x (object, property, etc.), x is fundamental iff x figures in an ungrounded fact.

Call the conjunction of Fact and Entity Fundamentality the *Grounding Account of Fundamentality*. It is endorsed by Bennett (2011), Dasgupta (2014), deRosset (2013), and Litland (forthcoming).[23] Some grounding theorists even *motivate* a commitment to the notion of ground by maintaining that fundamentality can be defined in terms of it. Indeed, Wilson (2014) maintains that without the notion of ground, fundamentality must be taken as primitive.

Now, suppose the fact that Jones is in pain ($[P]$) is grounded in the fact that Jones' c-fibers are firing ($[Q]$). That is:

[23]But see Fine (2001) (who appears to hold that the notion of fundamentality must be taken as primitive) and Raven (2015) (who rejects Entity Fundamentality).

(1) $[P] \leftarrow [Q]$.

We can now ask: Is (1) grounded or ungrounded?

There are two major problems with answering that (1) is ungrounded. First, if (1) is ungrounded, then the fact *that* (1) is ungrounded cries out for explanation. After all, the only relevant difference between (1) and, say, $[P]$ is that (1) has the grounding relation as a constituent. So why, according to the Grounding Physicalist, should $[P]$ be grounded but (1) not? It might be responded that the fact that the basic laws of physics are ungrounded likewise cries out for explanation and has none. The difference is that, plausibly, physicalism *entails* that there is no explanation of why the laws of physics are ungrounded—it is just an empirical postulate of physics that they are.[24]

Second, given the Grounding Account of Fundamentality, if (1) is ungrounded, then since *c-fiber firing* and *pain* are constituents of (1), Grounding Physicalism entails that c-fiber firing and pain are fundamental—even worse, that *Jones' c-fiber firing* and *Jones' pain* are fundamental. On this option, Grounding Physicalism countenances a proliferation of fundamental facts and entities. This is an intolerable result. For even if there is reason to think that phenomenal and neural *types* are fundamental, there is no reason to think that

[24]Even if the laws of physics are grounded in the natures of the items that figure into them, there will still be no explanation as to why those items have the natures that they do. This claim is actually consistent with a version of *metaphysical rationalism* according to which everything has a metaphysical explanation. The metaphysical rationalist will insist that it is in some sense illegitimate to ask why the fundamental constituents of reality have the natures that they do (Dasgupta 2014). Even if that is right, it is implausible to maintain that it is in *that same sense* illegitimate to ask what grounds facts like (1).

their *particular instances* are fundamental.

On the other hand, if (1) is grounded, then there must be some fact $[P']$ that grounds it.[25] But now the question arises as to whether $[P']$ is physical or not. If $[P']$ is apt to be explained,[26] then there is considerable pressure on the Grounding Physicalist to deny that $[P']$ is nonphysical. In the first place, Grounding Physicalism is typically motivated by a global grounding thesis: that every fact about (concrete) reality that is apt to be explained is either physical or fully mediately grounded in some non-empty set of physical facts. But if $[P']$ is nonphysical, then the global thesis is false, and one might then wonder why Grounding Physicalism should be accepted. Could it be that $[P']$ is nonphysical but grounded in some physical fact $[P^*]$? Grant this possibility for the sake argument. Given the transitivity of ground, there is still the fact *that* $[P^*]$ grounds (1). We can now ask whether *that* fact is grounded or not. If it isn't, then the earlier problems simply arise at a higher level.

It seems, then, that the Grounding Physicalist is forced to maintain that (1) is grounded in something physical after all. This is the line that Bennett (2011) and deRosset (2013) adopt. They maintain:

[25]One might worry that this introduces a vicious regress. Bennett (2011), Dasgupta (2014), deRosset (2013), and Litland (forthcoming) have each attempted to dispel this worry. See Rabin and Rabern (2016) for the definitive argument that it does not.

[26]Dasgupta (2014) calls a fact *autonomous* when it is not apt to be explained, by which he means that "the question of what grounds it does not legitimately arise" (576). Definitions, essentialist truths, and identity claims are all plausibly autonomous. According to Dasgupta, the physicalist is not committed to the claim that autonomous facts are grounded in physical facts. Hence the caveat. See Dasgupta (2016, §3) for an explication of the notion of autonomy.

Collapse: For all p and q, if $[p] \leftarrow [q]$, then $[[p] \leftarrow [q]] \leftarrow [q]$.

This principle entails that (1) itself is grounded in the fact that Jones' c-fibers are firing.

But how plausible is Collapse? Dasgupta (2014) provides two important reasons to reject it. First, Collapse implies that facts with intuitively distinct grounds are grounded in the very same fact. Consider disjunction. The fact that $[P]$ grounds $[P \vee Q]$. But what grounds the fact *that* $[P]$ grounds $[P \vee Q]$? According to Collapse, the fact that $[P]$ grounds $[P \vee Q]$ is itself grounded in $[P]$. However, since the fact that $[P]$ also grounds $[\neg\neg P]$, Collapse implies that both grounding facts are grounded in the very same fact: namely, $[P]$. But that seems wrong: the fact that $[P]$ grounds $[P \vee Q]$ has something to do with the nature of disjunction, whereas the fact that $[P]$ grounds $[\neg\neg P]$ has something to do with the nature of double negation.

Second, Collapse fails to provide satisfying explanations of facts like (1). For example, the existence of Socrates grounds the existence of {Socrates}. Now suppose someone asks *why* the existence of Socrates grounds the existence of {Socrates}, and Collapse delivers the following answer: "Because Socrates exists." This is not a satisfying explanation. We understood that Socrates exists, but what we asked is *why* Socrates' existence grounds {Socrates}. If we already found this mysterious, to be told that Socrates exists would not make it any more intelligible. Dasgupta then asks us to compare Collapse's explanation with a competing one: "Because it is *essential* to being a set that

for any x, if x exists, then the existence of x grounds the existence of $\{x\}$." This explanation is clearly superior.

The previous two problems for Collapse suggest that *essentialist truths* play some important role in explaining the grounding facts. I will follow Fine (1994, 1995a) in taking essentialist truths to have the logical form of $\Box_x P$, i.e., *it lies in the nature of x that P*. I will also limit the class of essentialist truths to those that specify the *constitutive* essence of a thing (Fine 1995b). So, as I understand it, the essentialist truths with respect to a given thing specify (in part) *what it is* to be that thing *in its most core respects*.

Dasgupta (2014) and Rosen (2010) are sympathetic to:

> *Brute Essentialism:* For any p and q, if $[p] \leftarrow [q]$, then $[[p] \leftarrow [q]]$ is grounded in $[q]$ *together with* an essentialist truth about some constituent of $[[p] \leftarrow [q]]$.

Brute Essentialism suggests that the fact that $[P \vee Q] \leftarrow [P]$ is itself grounded in $[P]$ together with the fact that it lies in the nature of disjunction that for all propositions p and q, if p is true, then $[p]$ grounds $[p \vee q]$. Similarly, Dasgupta suggests, (1) is partly grounded in an essentialist truth about *pain*. And if that is right, then, as I will argue in §4 below, Grounding Physicalism is already in big trouble.

However, there are two important reasons to resist Brute Essentialism. First, in response to Dasgupta's first objection to Collapse, the Ground-

ing Physicalist might endorse Collapse while maintaining that facts can be grounded in different *ways*.[27] For example, it might be said that the fact that $[P \vee Q] \leftarrow [P]$ and the fact that $[\neg\neg P] \leftarrow [P]$ are both fully grounded in $[P]$. The difference is that the way of ground for disjunction corresponds to disjunction introduction, whereas the way of ground for negation corresponds to double negation introduction.[28]

Second, analogies with logic and causation suggest that Brute Essentialism is founded on a mistake (cf. Bader forthcoming, 12). If the premises P and $P \supset Q$ are true, then the conclusion Q logically follows by the inference rule modus ponens. But modus ponens is not a *premise* in the argument; rather, the inference rule somehow "connects" the premises to the conclusion. Likewise, while a causal law L might somehow "govern" the causal relations between A-like events and B-like events, L does not *cause* any of those events. Moving from the claim that essentialist truths play some role in *explaining* the grounding facts to the claim that essentialist truths partly *ground* the grounding facts is like moving from the claim that inference rules connect premises to conclusion (or that causal laws govern causal relations) to the claim that those inference rules are premises in arguments (or that causal laws cause events).

In short, Dasgupta simply assumes that if essentialist truths provide for explanations of the grounding facts, then those explanations must be *grounding*

[27] I owe this suggestion to discussions with Jon Litland and Jonathan Schaffer.

[28] See Litland (forthcoming, §9) for a way of spelling out this suggestion within a broader grounding framework.

explanations. In response, the Grounding Physicalist might endorse Collapse while maintaining that essentialist truths explain the grounding facts in some other sense. For example, it might be argued that the fact that $[P \vee Q] \leftarrow [P]$ is fully grounded in $[P]$, but (looking to) the essence of disjunction somehow makes that grounding connection intelligible. Still, this discussion has been instructive. It suggests that there is an *explanatory* connection between ground and essence.

It is worth pausing to carefully appreciate where we are in the dialectic. The Grounding Physicalist is committed to the existence of grounding facts. Even if Collapse is true, these facts clearly cry out for explanation in *some* sense, and essentialist truths play a crucial role in securing such explanations. The Grounding Physicalist is not *yet* in trouble. Perhaps the fact that c-fiber firing grounds pain is to be unproblematically explained by the essence of something other than just pain. I now turn to showing why this suggestion won't work by looking at a related grounding phenemenon.

3.2 The grounding patterns

Suppose that the fact that Jones is in pain is grounded in the fact that his c-fibers are firing at rate 1.5 Hz. It is plausible to think that if another person's c-fibers were firing at rate 1.5 Hz, then that person, too, would experience pain. It is also plausible that a fact involving some other neural event (e.g., c-fibers firing at rate 1.4 Hz) might have grounded the fact that Jones is in pain as well. Furthermore, considerations of multiple realizability suggest that

the fact that Jones is in pain might have been grounded in a fact not involving neurons *at all*—say, if advanced surgery had previously left Jones' brain with fewer neurons than silicon chips (cf. Tye forthcoming).

Cases like these suggest that there exist *grounding patterns*. Drawing from Fine (2012), we can express this idea precisely.[29] Suppose that $[Q]$ grounds $[P]$. $[P]$ and $[Q]$ will have as constituents certain existing items a_1, a_2, ... and b_1, b_2, ..., respectively. Using $[P(a_1,\ a_2,\ \dots)]$ and $[Q(b_1,\ b_2,\ \dots)]$ to represent this, we can generalize away from the particular grounding connection to:

> *Grounding Pattern:* Necessarily, for any x_1, x_2, ... and y_1, y_2, ..., if $\phi(x_1,\ x_2,\ \dots)$, $\psi(y_1,\ y_2,\ \dots)$, and $Q(y_1,\ y_2,\ \dots)$ is the case, then $[P(x_1,\ x_2,\ \dots)] \leftarrow [Q(y_1,\ y_2,\ \dots)]$,

where $\phi(x_1,\ x_2,\ \dots)$ and $\psi(y_1,\ y_2,\ \dots)$ are conditions that in fact hold of a_1, a_2, ... and b_1, b_2, ..., respectively. If this grounding pattern holds, then the fact that $[Q]$ grounds $[P]$ logically follows from it.

To put the idea loosely, any time some physical event grounds an expe-

[29] See Fine (2012, p. 75), Rosen (2010, p. 131), and Wilsch (2015)'s "Generalization-principle." My formalization differs from their formalizations. Rosen appeals to "propositional forms," but I opt for Fine (2012)'s use of "conditions" due to his criticisms of Rosen (see his fn. 26). However, Fine's formalization includes the grounded fact (e.g., $[P]$) in the universal generalization. But suppose that Jones is in pain. Contrary to Fine, the grounding pattern involving pain may not be limited to just *Jones'* being in pain but may extend to *anyone's* being in pain. For this reason, after making it is clear that $[P]$ has certain existing items as constituents, I substitute variables for names of those constituents in the universal generalization itself.

rience of pain, say, that event has some property such that, *necessarily*, every event that has that property grounds the experience of pain.[30] The principle may not be completely obvious, but it is easy to multiply examples in which grounding connections entail grounding patterns. Thus, if the ball is scarlet, then its being scarlet grounds its being red. But that's true of any ball, and if the ball had been crimson instead, its being crimson would have also grounded its being red. The determinate properties of being scarlet and being crimson share something in common with all determinate shades of red: they ground the instantiation of red whenever they are instantiated.

The central question to be explored here is what explains the grounding patterns involving consciousness. One possibility is to say that these patterns are grounded in and thus explained by their instances. The advocate of Collapse might then argue that the grounding patterns do not pose some further problem. For if the grounding patterns are to be explained by the particular grounding facts, then the real mystery is why each particular grounding connection holds. If only we could explain every grounding fact, we would have a complete explanation of the grounding patterns. No further mystery would remain.

There are two problems with this proposal. In the first place, each of these universal generalizations falls within the scope of a necessity operator,

[30]Litland (2015) presents a counterexample to this loose statement of the principle, but since the counterexample is a problem for everyone, I will continue to speak loosely throughout.

and while there is no consensus on what grounds necessitated truths, no one says that necessitated universal generalizations are even partially grounded in their instances. So, it's simply false that we can explain the grounding patterns involving consciousness by explaining, in piecemeal fashion, why each particular grounding connection holds. But for the sake of argument, let's set the necessity operators aside. It's true that if each universal generalization is grounded in its instances, then the grounding patterns are *metaphysically* explained by their instances. But that isn't the sort of explanation we were looking for. As Dasgupta (2014) puts it, "We want to know why all those instances turned out alike—just repeating the instances is no answer" (570). Just as the facts about what grounds what cry out for explanation (even if Collapse is true), so also the grounding patterns cry out for explanation (even if they are grounded in their instances).

Could it be that the grounding patterns are to be explained by the nature of some property that the grounds all share? In general, this isn't the case. It's true that for any x, if x exists, then its existence grounds $\{x\}$. From numbers to people, this pattern holds. But there is nothing common to numbers and people that could explain the grounding pattern involving sets and their members. To put the point more abstractly, it doesn't lie in the nature of *existence* or *entityhood* that the existence of entities grounds the existence of their sets.

In addition, according to Rosen (2010), if the grounding pattern involving pain and c-fiber firing is to be explained by the nature of c-fiber firing,

then "the analgesic neuroscientist who knew everything about the detailed physiology of c-fibers and their role in the functional economy of the organism but who knew nothing about pain would have an incomplete understanding of *what it is* for a c-fiber to fire" (133). But that seems implausible: "[I]t is hard to see why [the neuroscientist's] understanding of the *essence* or *definition* of this particular neurological kind should be defective" (133).[31]

Perhaps the grounding patterns are to be explained by the nature of some property the grounds all share together with the nature of *ground* (cf. Fine 2012, 77). On this suggestion, there exists an extremely complicated truth of the form $\Box_{ground}$ $(P \wedge Q \wedge \dots)$, which somehow mentions each and every grounding pattern involving consciousness. There are three major problems with this view. First, it just doest doesn't seem to be in the *nature* of ground that the grounding patterns hold: if one is ignorant of a single grounding pattern, one is not *thereby* ignorant of what ground *is*. That is why the colorblind metaphysician might fully grasp the essence of ground despite knowing nothing of the grounding patterns involving color. Second, on this view, if at least one grounding pattern is knowable only a posteriori (as seems highly plausible), then it is impossible to grasp the full essence of ground a priori. This suggests that the epistemology of ground is perversely unlike the

[31]The panpsychist might object that, given our ignorance of the intrinsic nature of the physical, we have no idea whether the essence of c-fiber firing mentions pain. This move is unavailable to the Grounding Physicalist, given my stipulative remarks about the term "physical"; see fn. 17 above. It is also implausible: even if neural role properties are ultimately realized by experiential "quiddities," the *definitions* of those role properties won't mention any quiddities in particular (Lewis 2009).

epistemology of every other notion in metaphysics. Finally, it is difficult to understand why the essence of ground should mention only the grounding patterns that *in fact* hold. It's true that, necessarily, for any x, if x is scarlet, then x's being scarlet grounds x's being red, while it's false that, necessarily, for any x, if x is scarlet, then x's being scarlet grounds x's being *blue*. Why is that? On the current proposal, the best we can say is that it lies in the nature of ground that the first proposition be true, while it does not lie in the nature of ground that the second proposition be true. But that seems more *ad hoc* than informative.

Maybe I am being unfair to this proposal. It might be suggested that the essence of ground does not mention the grounding patterns by name but instead entails them. This might well be true. Perhaps it is essential to ground that there be grounding patterns if anything grounds anything at all. However, this suggestion does not help the Grounding Physicalist. On this modest proposal, the nature of ground simply *presupposes* the grounding patterns without *explaining* any of them. It might explain why grounding facts entail grounding patterns in general. But the challenge that confronts the Grounding Physicalist is not to explain why there are any grounding patterns at all but rather to explain why there are grounding patterns involving phenomenal properties specifically.

My claim is that the grounding patterns involving consciousness are to be explained by the nature of consciousness. This follows from a general picture of ground: that grounding patterns are *always* to be explained by

the natures of grounded items. As Fine (2012) puts it, "It is the fact to be grounded that 'points' to its grounds and not the grounds that point to what they may ground" (76). A handful of examples lend to the plausibility of this view. Why does the existence of a plurality of objects ground the existence of the set of those objects? Because it lies in the nature of a set that if its members exist, then those members ground the existence of the set of those members. Why does the instantiation of a determinate shade of red ground the instantiation of red? Because it lies in the nature of red that if some object is a determinate shade of red, then its being that shade of red grounds its being red. Indeed, it is hard to find examples in which the essence of a genuinely grounded fact *doesn't* point to its grounds.[32] However, my arguments do not depend on the general picture. It is enough for my purposes that the picture holds with respect to the grounding patterns involving consciousness, even if it fails to hold across the board.[33]

[32]Compare Greenberg (2001): "In very many cases in which we understand the nature of a phenomenon, that nature can help us to explain its grounds. That certain subatomic facts ground the fact that there is water in this glass is in part explained by water's being H_2O. That certain complex social facts ground the fact that the United States was at war with Germany in 1944 is in part explained by what it is to be at war. That my being an American citizen grounds the fact that I am an American citizen or I was born in the 17th century is in part explained by its being of the essence of disjunction that for a disjunction to be true is for one of its disjuncts to be true. It is easy to multiply examples" (173).

[33]Trogdon (forthcoming) argues that just as informative scientific explanations appeal to *causal mechanisms* that explain how particular causal transactions take place, so also should grounding explanations appeal to *grounding mechanisms* that explain how grounding connections run from the grounds to the grounded. He includes relations such as the *determinable–determinate relation* and the *functional realization relation* in this category and maintains that the essences of these relations entail grounding connections. While this suggestion is interesting in its own right, it will not help Grounding Physicalism as I understand it. For while the essence of the functional realization relation, for example, might explain the fact that c-fiber firing grounds pain, this will be so only if c-fiber firing *func-*

At this point, it might be objected that the grounding patterns involving consciousness are to be explained by "metaphysical laws" as opposed to essentialist truths. After all, there is some plausibility to the idea that the grounding pattern involving red and the determinate shades of red is to be explained by a *determinable–determinate law*; the grounding pattern involving sets and their members by a *set-formation law*; and the remaining grounding patterns by various other "construction–operation laws" (Wilsch 2015). So why not take the grounding patterns involving consciousness to be explained by psychophysical metaphysical laws?

There are some serious problems with this proposal. In the first place, each of the examples used to motivate the notion of a metaphysical law satisfies a *generality constraint* by governing a wide variety of objects and properties while mentioning only a privileged subset of them by name. If there really is a determinable–determinate law, for example, then it must subsume *every* specific determinable–determinate grounding pattern. Moreover, such a law seems to be the sort of thing we are in a position to know a priori; otherwise, it is obscure how empirical investigation could ever put us in a position to know that such a generality is a law of *metaphysics* as opposed to a law of *nature*.[34]

tionally realizes pain. Yet, the claim that c-fiber firing functionally realizes pain very likely commits one to holding that pain is *identical* to a functional property. We will have come full circle. Trogdon himself is sensitive to this: "Given the mechanical backing claim we can understand the so-called explanatory gap challenge to physicalism as follows: it strikes us that the connection between the mental and physical isn't mediated by grounding mechanisms" (18). I would go further: we have *defeasible evidence* to believe that mental–physical connections aren't mediated by grounding mechanisms.

[34]Pautz (MS) raises this objection to Schaffer (forthcoming).

By contrast, it is extremely unlikely that there is a single metaphysical law that subsumes and fully explains *every* grounding pattern involving consciousness. At best, there will be a whole range of metaphysical laws to reflect a diversity of phenomenal experiences. That is already reason enough to be suspicious of the proposal. To make matters worse, these laws won't be the sorts of things we can know a priori, nor is it clear that we could ever discover them a posteriori.

Perhaps these challenges can be met. Ultimately, the decisive reason to reject this proposal is that it is dialectally inimical to Grounding Physicalism. It forces the Grounding Physicalist to substitute brute metaphysical laws for brute supervenience relations.[35] These "metaphysical danglers" cry out for explanation and yet have none. The essentialist picture is not obviously subject to this same criticism. Essentialist truths specify *what it is* to be something. They are "autonomous" in that they are not apt to be explained in the first place (Dasgupta 2014, 2016).

If the essentialist picture is right—and the shortcomings of the alternatives suggest that it is—then the grounding patterns involving pain are to be explained by the nature of pain. The arguments for this picture also show why the *grounding facts* cause trouble for Grounding Physicalism. For the essence of *c-fiber firing* no more explains the *particular instances* of the grounding pattern involving c-fiber firing and pain than it explains the grounding pattern

[35]Thanks to Daniel Stoljar for helping me to appreciate this point. Pautz (MS) raises a similar objection to Russellian monism.

itself. This the first step to establishing my dilemma for Grounding Physicalism.

It is of crucial importance to note that these explanations need not be grounding ones. That is, essentialist truths might *explain* the grounding facts and patterns without themselves *grounding* them. As a result, *even if the Grounding Physicalist endorses Collapse*, there still significant pressure on the Grounding Physicalist to accept the claim that the grounding facts involving consciousness are to be explained by the essence of consciousness itself.

4 The Explanatory Gap

For convenience, I will refer to the facts about what grounds what and the grounding patterns as *grounding phenomena*. In the previous section, I argued that the grounding phenomena involving consciousness are to be explained by truths about the nature of consciousness. The problem, to be explored in this section, is that there just doesn't seem to be anything about the nature of consciousness that could explain the grounding phenomena involving it. Therefore, if true, Grounding Physicalism leaves an explanatory gap.

At this stage, I need to say what I mean by "explanatory gap." This requires saying something about the notion of *explanation*. A detailed assessment falls outside the scope of this paper, but I take it that there is a perfectly respectable sense of "explanation" in which one phenomenon is (or can be) made intelligible in terms of another (cf. Levine 1983, 358). Following Jenkins (2008), we might also say that "explanations are things that can provide answers to why-questions" (71). Some why-questions pertain to grounding phenomena, and they are to be answered by the essences of things. My claim is that the essence of consciousness does not make the grounding phenomena involving consciousness intelligible, nor does it answer the crucial why-questions pertaining to those grounding phenomena. As a result, Grounding Physicalism fails to explain those phenomena—that's what I mean when I say that Grounding Physicalism leaves an explanatory gap.[36]

[36]Some philosophers understand the explanatory gap in terms of a failure of a priori deducibility. For example, Chalmers and Jackson (2001) maintain that the nonphysical

This is not to deny that the Grounding Physicalist can (at least in principle) explain the occurrence of conscious experiences. The reason is that ground is an explanatory notion, so if a given conscious experience really is grounded in a physical event, then that conscious experience is fully *metaphysically* explained by that physical event. However, there is an important sense in which the Grounding Physicalist is unable to explain why physical events give rise to *certain* conscious experiences *rather than others*. For the Grounding Physicalist lacks an explanation of putative grounding patterns like the following:

(2) Necessarily, for any x, if x's c-fibers are firing, then the fact that x's c-fibers are firing grounds the fact that x is in pain.

When we look to the essence of pain, I submit, we learn nothing to rule out the possibility of there being an x such that x's c-fiber firing grounds x's experiencing *pleasure*. So, Grounding Physicalism leaves an explanatory gap in one traditional sense of failing to explain why, in general, having one's c-

truths can be explained by the physical truths only if they can be derived a priori from the microphysical truths together with a "that's all"-statement and indexical information (conjoined together, *PTI*). Since the nonphysical truths can't be derived a priori from *PTI*, they suggest, the nonphysical truths are not explainable in terms of the physical truths. In that sense, physicalism leaves an explanatory gap. However, the idea that explanation requires a priori deducibility is controversial (Block and Stalnaker 1999; Tye 2009, §3.7). Moreover, the Grounding Physicalist might accuse Chalmers and Jackson of neglecting to add grounding information to their scrutability base (Schaffer forthcoming, 18). By contrast, my argument does not crucially depend on the controversial claim that explanation requires a priori deducibility. For all I have said, some essentialist truths are knowable only a posteriori.

fibers fire should feel the way that it does rather than some other way or no way at all (Levine 1983, 358).

But why accept the claim that the essence of pain fails to explain the putative grounding phenomena involving it? While it would take a paper-length treatment to motivate this claim in any detail, it is enough for my purposes to simply establish its plausibility. So, I will briefly discuss two reasons for accepting it.

First, suppose that c-fiber firing is one possible ground for pain. In order to explain the grounding phenomena involving pain and c-fiber firing, the Grounding Physicalist must maintain that:

(3) $\Box_{pain}\ \forall x(x$'s c-fibers are firing $\supset$ ([x is in pain] $\leftarrow$ [x's c-fibers are firing])).

It may be that (3) specifies only the *mediate* essence of pain (Fine 1995a). For intuitively, the *immediate* essence of a thing includes only what has a direct bearing on that thing. For example, while it may be of the immediate essence of {Socrates} to contain Socrates, and of the immediate essence of Socrates that he originate from the particular sperm and egg from which he actually originated, it is only of the mediate essence of {Socrates} to contain an individual that originated from a particular sperm and egg. So it may be that we can only arrive at (3) by chaining the immediate essences of various things together. I will take no stand on what those things might be. The point

remains: if c-fiber firing is one possible ground for pain, then the Grounding Physicalist is committed to the truth of (3).

The problem with (3) is that it is conceivable that there be a system that is identical to an ordinary conscious human being in all physical respects, but that differs with respect to its phenomenal experiences. For example, when this system's c-fibers fire, it might feel pleasure rather than pain. Alternatively, the system might be a complete *zombie*: functionally and behaviorally indiscernible from an ordinary human being but completely unconscious. The claim that conceivability *entails* metaphysical possibility is controversial, so a complete zombie might be metaphysically impossible. But the conceivability of zombies at least provides defeasible *evidence* for thinking that propositions like (3) are false (cf. Pautz 2014, 170). Absent defeaters, the explanatory gap persists.

Second, a number of philosophers are sympathetic to a *thesis of revelation* with respect to phenomenal properties like pain.[37] According to the thesis of revelation, in having a phenomenal experience, one is an epistemic position to know the full essence of that experience (Stoljar 2006, 221). Thus, in experiencing *pain*, one is an epistemic position to know all the essentialist truths about pain. The problem for Grounding Physicalism is that, if revelation is correct, one should be in an epistemic position to know that (3) is true on the basis of painful experiences alone. But one is in no such position. If you are

[37]Some philosophers even endorse the thesis of revelation with respect to the colors (Campbell 1997; Strawson 1989).

skeptical, then the next time you stub your bare toe on a piece of furniture, just pay extra attention to the unpleasant experience you undergo. In experiencing pain, I, for one, have the intuition that essence of pain is exhausted by its *painfulness*.

While the thesis of revelation is controversial,[38] the Grounding Physicalist should have *something* to say by way of response. And the fact that this is so puts the Grounding Physicalist in a dialectally awkward position, because one motivation for Grounding Physicalism is that it is initially *consistent* with the thesis of revelation.

In light of these problems, the Grounding Physicalist might fall back on the modest claim that it lies in the nature of pain that it should have *some* physical ground. Fine (2012) is sympathetic to this claim when "ground" is understood as "natural ground" (as opposed to "metaphysical ground"). However, even some notable physicalists maintain that there are metaphysically possible duplicates of the actual world containing additional, physically ungrounded experience.[39] The world might have contained pain-feeling ectoplasm, for example. In any case, physicalism—an empirical hypothesis about *our* world—shouldn't *entail* that such a world is impossible. If that is right,

[38]Hilbert and Byrne (2007), Stoljar (2006), and Trogdon (2015), for example, provide some important reasons to reject it.

[39]See Horgan (1982), Jackson (1994), Lewis (1983), and Melnyk (2003). As Melnyk (2003) puts it, "Nothing in the nature of mental properties rules out the possibility that they should have been realized by properties of some utterly different kind, even by ectoplasmic properties (if such there could be)" (8). This gives rise to the *epiphenomenal ectoplasm problem* for physicalism. See Stoljar (2010, §7.6) for discussion.

then there is reason to doubt even the modest claim. For in ectoplasm worlds, there are experiences of pain that are not physically grounded at all.

It might be objected that the proposed possibility of ectoplasm worlds begs the question against the Grounding Physicalist. While a *minimal statement* of physicalism shouldn't entail the impossibility of ectoplasm worlds, Grounding Physicalism, as I have understood it, is supposed to be a version of physicalism. So, the apparent possibility of ectoplasm worlds is no more a reason to reject Grounding Physicalism than it is to reject the type-identity theory.

This is not a strong response. Since the conceivability of ectoplasm worlds provides defeasible evidence to think that they are metaphysically possible, the physicalist owes us some explanation as to why those worlds are really impossible. According to a priori type-identity theorists, for example, concepts for phenomenal properties are analyzable in causal/functional terms. If our best neuroscience reveals that c-fiber firing, say, plays the pain role, then that gives us as much reason to think that pain is c-fiber firing as we have to think that water is H_2O. When we conceive of an ectoplasm world—as when we conceive of watery stuff on Twin Earth—we conceive of a world in which something other than c-fiber firing plays the pain role, but we should no more conclude that *pain* is instantiated in that world than we should conclude that *water* exists on Twin Earth. This version of the type-identity theory has something similar to say about the apparent conceivability of zombies.

But what does the Grounding Physicalist have to say when confronted

with the conceivability of zombie and ectoplasm worlds? After all, the Grounding Physicalist denies that pain is identical to a physical or functional property. So, it won't help to draw the usual analogies with empirical discoveries in the physical sciences. This suggests that the Grounding Physicalist simply lacks the resources to defeat the evidence we have for thinking that the essence of consciousness fails to explain the grounding phenomena involving it. My provisional conclusion is that Grounding Physicalism leaves an explanatory gap. This is the second step to establishing my dilemma for Grounding Physicalism.

5 Closing the Gap

If Grounding Physicalism leaves an explanatory gap, can the Grounding Physicalist find some way to close it? I think so—but not without abandoning the considerations that motivated Grounding Physicalism in the first place. However, in order to appreciate that point, it is first important to appreciate why this explanatory gap is distinctive. This requires looking at a popular response to the explanatory gap argument in the philosophy of mind.

The popular response to the claim that physicalism leaves an explanatory gap is to argue that *if* physicalism is true, nothing has been *left unexplained* and, therefore, there is no *explanatory* gap. For example, Tye (1999) tells us:

> Take the referent of the term 'Q' and the referent of the term 'this feeling'—conceive of those referents as you will—why is the former the same as the latter? If this is how the question is understood, then there is no significant question here for the physicalist. Only one state exists, conceived of in two ways, and that state must be self-identical. On this interpretation, then, there is no need for an answer and no explanatory gap. (717)

Similarly, according to Papineau (2002):

> A mind-brain identity simply says of something that it is itself. . . . I say that once you really accept that pain, say, really *is* some material M, then you will see that this requires no more explanation than does Mark Twain = Samuel Clemens. *Identities need no explaining.* (150; emphasis added)

Rather, the so-called "explanatory gap" is a "cognitive illusion" (Tye's phrase), the remnant of an "intuition of distinctness" (Papineau's phrase). Balog

(2012a,b), Block and Stalnaker (1999), and Block (2007) more or less follow suit.

The intuition of distinctness, these philosophers maintain, is to be accounted for by the distinctive character of phenomenal concepts. Unlike the public concepts WATER and HEAT, phenomenal concepts do not admit of definitions in non-phenomenal terms, nor is their reference fixed by associated causal roles. Instead, phenomenal concepts refer to phenomenal properties directly, much like names. One reason, then, that the type-identity theory seems to leave an explanatory gap is because psychophysical identity claims do not admit of the same explanations as other scientific identity claims. For example, we can explain why water = H_2O in the sense that we can come to understand how H_2O manages to play the causal role associated with the concept WATER. By contrast, since the phenomenal concept PAIN is not a priori associated with any causal role, we cannot provide the same kind of supposed explanation for the claim that pain = c-fiber firing. But that does not mean that something which is *apt to be explained* has been *left unexplained*.

Notice, however, that this response to the explanatory gap problem *presupposes* a type-identity theory. The central claim is that it *makes no sense* to explain why one thing is identical to itself. By contrast, the Grounding Physicalist denies that phenomenal properties are identical to physical or functional properties. The problem that the Grounding Physicalist confronts is that it *does* make sense to explain grounding facts and patterns. *Grounding phenomena, unlike identities, are apt to be explained*. Therefore, if Grounding

Physicalism is true, it leaves a genuinely *explanatory* gap, not a mere cognitive illusion. The popular response does not straightforwardly apply.

The Grounding Physicalist's only hope of closing the explanatory gap is to say something about the *nature* of consciousness that accounts for the grounding phenomena involving it. This does not automatically commit the Grounding Physicalist to giving a reductive account of consciousness.[40] There are a number of non-reductive positions that arguably incur essentialist commitments. The non-reductionist about determinable colors might deny that there is a full real definition of red in terms of the determinate shades of red but concede that it is essential to red that for any x, if x is scarlet, then the fact that x is scarlet grounds the fact that x is red. It is open to the Grounding Physicalist to likewise claim that the essence of pain lists out each of its grounds, even though there is no biconditional analysis of pain in terms of those grounds. There is still a big difference between these positions. The non-reductionist about color is not committed to giving even a *partial* analysis of red in *non-color* terms. By contrast, the Grounding Physicalist must say that the essence of pain mentions properties of a radically different kind. We might call such a position *partially reductive*.

[40]I assume that *reduction* can be spelled out in terms of both *identity* and *real definition*, and I follow Rosen (2015) in taking these to be distinct (but closely related) notions. Philosophers sometimes imply that *disjunctive* identifications or analyses do not properly count as reductions (see, e.g., Rosen 2015, 192–3). But when engaging in particular philosophical disputes, many philosophers are happy to count disjunctive accounts as reductive—e.g., some color physicalists identify colors with disjunctions of reflectances (cf. Hilbert and Byrne 2007, 75). I will follow in the tradition of counting disjunctive identifications or analyses as reductions.

However, there is a good case to be made that the Grounding Physicalist is ultimately committed to providing a *full* reductive account of consciousness. Consider the paradigm cases in which we have reason to posit essentialist truths with respect to a given phenemenon without giving a full reductive account of that phenemenon. These involve determinables and determinates, sets and their members, disjunctions and their disjuncts, and so on. In these cases, we have an a priori basis for positing essentialist truths. This is not a good model for the Grounding Physicalist. For even if it is essential to pain that for any x, if x's c-fibers are firing, then the fact that x's c-fibers are firing grounds the fact that x is in pain, that does not seem to be the sort of thing we are in a position to know a priori. In fact, that looks like a statement of the *mediate* essence of pain, which is ultimately to be derived from the yet to be discovered *immediate* essence of pain.

The Grounding Physicalist should instead appeal to cases of scientific discovery for a model. Consider the case of *jade*. Chemistry has revealed something important about the nature of jade. We might describe this discovery in one of two ways. First, we might hold that jade has a *functional* nature: the property of being jade just *is* the second-order property of having some property or other that plays the jade-role. This puts us in a position to know that it is *mediately* essential to jade that for any x, if x is composed of jadeite, then the fact that x is composed of jadeite grounds the fact that x is jade. Second, we might hold that jade has a *disjunctive* nature: the property of being jade just *is* the property of being either jadeite *or* nephrite. On this

proposal, it is *immediately* essential to jade that for any x, x is jade if and only if x is composed of either jadeite or nephrite. Either way, we have a *reductive* account of jade. The other paradigm cases of scientific discovery fit this pattern.

This suggests that the Grounding Physicalist's only hope of closing the explanatory gap through empirical investigation is to *identify* phenomenal properties with physical/functional properties or to provide full *real definitions* of phenomenal properties in physicalistically acceptable terms. However, if the Grounding Physicalist can pull this off, Grounding Physicalism will no longer be a non-reductive view. Yet, one of the *primary motivations* for Grounding Physicalism is that it promises to occupy a middle position between reductive and non-reductive versions of physicalism. Therefore, if my overall argument succeeds, Grounding Physicalism faces a dilemma:

> *Dilemma:* Either Grounding Physicalism leaves a genuinely explanatory gap, or the Grounding Physicalist must provide a reductive account of consciousness, thereby giving up one of the central motivations for the view.

It might be objected that the first horn of this dilemma isn't a serious problem for Grounding Physicalism. Schaffer (forthcoming) argues that if we look hard enough, we can find explanatory gaps almost everywhere. Consider an H_2O molecule and the individual hydrogen and oxygen atoms that compose it. Since mereological nihilism is conceivable/logically possible/not ruled out

a priori, it is conceivable/logically possible/not ruled out a priori for hydrogen and oxygen atoms to be distributed and related exactly as they actually are and yet there be no H_2O *molecules*. (The nihilist will instead say that there exist a bunch of hydrogen and oxygen atoms arranged "H_2O-wise.") While we could easily multiply examples, there is a general conclusion we might draw: there is a fundamental–derivative explanatory gap. And even if there isn't, we can at least find explanatory gaps in the history of science. Early biologists, for example, struggled to comprehend how *life* fits into a materialist picture of the world. There was an explanatory gap for them. But that wasn't a serious reason to abandon physicalism. Why should the situation be any different for Grounding Physicalists?

The difference is that we have an explanation of the grounding phenomena involving H_2O, and that's because we know a great deal about the natures of chemical kinds and the relations they enter into.[41] Similarly, biologists eventually closed whatever gaps they faced by *reducing* facts about life to facts about cellular activity. Once the facts about life were reduced to cellular activity, it was no longer unintelligible how life was supposed to fit

[41]In personal communication, Schaffer suggested that the essentialist truth with respect to H_2O is: it lies in the nature of H_2O that if there is an individual composed of an H, another H, and an O atom, arranged and bonded in the right ways, then it is an H_2O molecule. Such an essentialist truth leaves open whether there is any such individual. But this just strikes me as wrongheaded. It might be essential to H_2O that it *be* an individual, but why think that the essence of H_2O quantifies over itself in such a way? I suggest the alternative: it lies in the nature of H_2O that if there is an H, another H, and an O atom, arranged and bonded in the right ways, then that fact grounds the fact that a particular H_2O molecule exists. Once we know all the relevant empirical facts about atoms, such an essentialist truth does not leave open whether there are any H_2O molecules.

into a material picture of the world. By contrast, we have no explanation of the putative grounding phenomena involving consciousness, and we also have the strong intuition that *no* amount of empirical information will suffice for one (cf. Trogdon 2015).

Still, it might be objected that the alleged explanatory gap is simply a cognitive illusion, which is to be expected given the distinctive character of phenomenal concepts. *Pain*, for example, has a hidden nature, but we fail to recognize this because we only know about pain under a phenomenal concept. If only we knew the natures of phenomenal properties, the grounding phenomena involving consciousness would be fully intelligible to us.

However, given that grounding phenomena are apt to be explained, this response just concedes the problem. The only thing that it adds is an explanation of *why* there is a problem in the first place. According to this response, the Grounding Physicalist is unable to explain the grounding phenomena because consciousness has a hidden essence. But either the essence of consciousness can be revealed via a priori analysis or empirical investigation, or it cannot. To accept the first horn of *this* dilemma just is to accept the second horn of my dilemma for Grounding Physicalism. On the other hand, if phenomenal concepts are a bar to our *ever* knowing the full essence of consciousness, then Grounding Physicalism turns out to be a version of "mysterianism" according to which the explanatory gap is unclosable (McGinn 1989).

So, what about just accepting the second horn of the dilemma? The problem is that a number of philosophers—both physicalists and anti-physicalists

alike—have concluded that no reductive account of consciousness will ever succeed. That is why Grounding Physicalism, as I have understood it, is such an enticing option. But on this horn of the dilemma, Grounding Physicalism ultimately requires the same philosophical tools that philosophers of mind have been using for decades (e.g., reduction and identity).[42]

The alternative is to accept that Grounding Physicalism leaves an explanatory gap. Some philosophers, I imagine, are willing to pay this price to avoid the problems of rival accounts. But many will take the existence of the explanatory gap to be strong evidence that there is a *ontological* gap between the physical and the mental. These philosophers, like Fine, might give up the claim that consciousness is *metaphysically* grounded in the physical and instead defend the weaker claim that it is *naturally* grounded in the physical. These philosophers will find in turn that they have arrived at a version of dualism. It remains to be seen which cost is greater.

[42]This conclusion should be friendly to Wilson (2014, 2016). In my view, the grounding theorist's best recourse is to argue that the notion of ground is indispensable to metaphysical tools that are widely used in philosophy, such as reduction, functional realization, constitution, and so on. While the notion of ground might fail to help us attenuate the mind–body problem, perhaps it helps us to state with precision what the problem is in the first place.

6 Conclusion

In this paper, I have argued that Grounding Physicalism initially promises to occupy a middle position between traditional reductive and non-reductive versions of physicalism. Its main appeal is that it has the resources to locate the mind in the physical world without thereby identifying mental phenomena with (or defining mental phenomena in terms of) physical phenomena. I then went on to argue that the grounding phenomena involving consciousness are to be explained by truths about the essence of consciousness. Grounding Physicalism leaves an explanatory gap, I argued, because there is nothing about the essence of consciousness that could explain the grounding phenomena involving it. Moreover, this gap cannot be addressed in the usual way, because grounding phenomena (unlike identities) are apt to be explained. Ultimately, the Grounding Physicalist is forced to leave a distinctive explanatory gap or else to embrace the reductionist project whose apparent failure motivated Grounding Physicalism in the first place. Perhaps, then, the notion of ground is much less useful to the mind–body problem than has been recently suggested.

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